



PATENT

PD-100202582-1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Confirmation No.: 7437

LINDA UHLIR-TSANG ET AL

Serial No.: 10/628,903

Group Art Unit: 1755

Filed: July 28, 2003

Examiner: H. G. Klemanski

For: ADDITIVES TO ELIMINATE BRONZING OF INK-JET INK  
FORMULATIONS ON SPECIALTY QUICK-DRY INK-JET  
PHOTOGRAPHIC MEDIA

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MAIL STOP AMENDMENT

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

DECLARATION UNDER 37 CFR 1.131

Dear Sir:

We, LINDA UHLIR-TSANG, JOHN R. MOFFATT, AND MARY E. AUSTIN, declare and state as follows:

1. We are the inventors of the above-identified patent application.

2. At a time prior to the filing date of U.S. Patent Application Publication No. 2004/0003755 A1 entitled "INK COMPOSITION, INKJET RECORDING METHOD USING THE SAME AND RECORDED MATTER" and published on January 28, 2004, in the names of Hiroshi Fukumoto et al (filing date April 21, 2003), we conceived and reduced to

practice in the United States of America the invention disclosed and claimed in our patent application.

3. Attached hereto is a true copy of the following item, with dates expunged:

(a) Exhibit A: Invention Disclosure PDNO 100202582, which discloses the conception and reduction to practice.

4. Exhibit A pre-dates the filing date of the publication.

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: Sept. 26, 2005

Linda Uhler-Tsang  
LINDA UHLIR-TSANG


Date: Sept. 26, 2005

John R. Moffatt  
JOHN R. MOFFATT

Date: 9/26/2005

Mary E. Austin  
MARY E. AUSTIN

## EXHIBIT A

	<b>Invention Disclosure</b> (WKRP Document Number 20020212.170536)		<b>Done Printing</b>
	PD No. 100202582	Date Received by Legal	Managing Attorney Curtis Rose

The information contained in this document is **HP CONFIDENTIAL** and may not be disclosed to others without prior authorization. Submit this disclosure to the HP Legal Department as soon as possible. No patent protection is possible until a patent application is authorized, prepared, and submitted to the Government.

**General Information**

**Write a descriptive title of the invention.**

Additives to Eliminate Bronzing of Inkjet Ink Formulations

**Write a brief abstract of the invention.**

The present invention describes the use of claimed compounds to prevent bronzing of inkjet inks. These compounds prevent bronzing by their basicity relative to the bronzing dye(s) and media of interest. In addition, the hue of the bronzing dye(s) is shifted towards that when printed on media on which the dye(s) do not bronze.

**Select projects associated with disclosed invention.**

007, 4.0, GoldenEye, Goldfinger and Magma

**Select product names or numbers associated with this invention.**

Goldeneye, Goldfinger and Magma

**Description of Invention**

**List prior solutions and their disadvantages.**

A prior solution is to raise the pH of the ink, as stated in US patent 5,062,893, assigned to Hewlett - Packard. This solution is liable to cause materials degradation by the inks.

**Explain the problems solved by the invention.**

Bronzing is a lustrous sheen of a printed sample in reflected light which can be associated with only certain colors. This is an undesirable print quality issue for the customer and prevents color attributes from being measured.

This invention improves bronzing to acceptable levels or eliminates it altogether.

**What are the advantages of this invention over what has been done before?**

The advantages of this invention over increasing the pH of the ink are that pH-sensitive materials are not jeopardized and that there are a wide range of compounds which can be utilized in the employment of the invention, leaving the formulation space open.

**Describe the construction and operation of the invention.**

Compounds can be added to an inkjet ink to prevent bronzing. The present invention involves the

addition of compounds having a  $pK_a(s)$  above the  $pK_a(s)$  of the dye and lower than that of the ink. The ink must be at a pH above the highest applicable  $pK_a$  of the dye. These compounds in the ink, upon being jetted onto an acidic media, will raise the pH of the media in the vicinity of the dye, preventing bronzing and causing a hue shift relative to ineffective ones. Examples include: 3-pyridylcarbinol, triethanolamine, N-methyldiethanolamine, and N-phenyldiethanolamine. (See Table 1.)

The additive(s) to the ink and the concentration necessary to prevent bronzing depends upon: the concentration of dye printed, the  $pK_a$  of the additive, the  $pK_a(s)$  of the dye, and the pH of the media. For example, an experimental phthalocyanine dye has a  $pK_a$  at 7.5. The ink is at pH 8-8.5. Adding a compound such as triethanolamine (aqueous  $pK_a$  7.77) at 10% eliminates bronzing onto an experimental media with a pH of 4. Adding diethanolamine (aqueous  $pK_a$  8.88) does not affect bronzing, likely due to the fact that the majority of the diethanolamine is protonated in the ink (i.e., the effective concentration of solvent is lower) and cannot significantly raise the pH of the local media environment. (See Table 1.)

In addition, the hue angle of the bronzing dye on the media shifts under milder conditions (e.g., lower concentration, higher  $pK_a$  of additive) than that required to eliminate bronzing. (See Table 1, diethanolamine and triethanolamine.)

Herein we claim:

1. Amines with a  $pK_a$  in the range 5-11. Classes of compound include: alkylamines, ammonia, ethanolamine derivatives, pyridine derivatives, amino acids.
2. Carboxylic acids with a  $pK_a$  in the range 5-11. Classes of compound include polycarboxylic acids such as adipic and succinic acids.
3. Buffers (organic and inorganic) with a  $pK_a$  in the range 5-11. Classes of compound include : Trizma, MOPS, sodium bicarbonate.
4. Compounds listed in claims 1-3 used in the ink in the working at a range of 2-15 wt%.
5. Compounds listed in claims 1-3 in which the  $pK_a$  is above the highest applicable  $pK_a$  of a bronzing dye.
6. Compounds listed in claims 1-3 in which the  $pK_a$  is above a media that bronzes.
7. Compounds listed in claims 1-3 in which the  $pK_a$  is from 0.5 units above to any value below the pH of the ink.

## Invention History

Was a description of the invention published, or are you planning to publish? If so, when and in what publications?

No

When was this invention published?

Describe the details of the publication of this invention

Was a product including the invention announced, offered for sale, sold, or is such activity proposed? If so, when and where?

No
When was this invention announced, offered for sale, or sold?
Describe the details of the announcement of this invention.
Was the invention disclosed to anyone outside of HP, or will such disclosure occur? No
Date this invention was or will be disclosed:
Describe the details of the disclosure of this invention. To whom will/has it been disclosed?
Will the invention be published, announced, or disclosed in the next 3 months? No
Was the invention described in a lab book or other record? Yes
Where, when, and how was this invention described? The invention is described in lab notebook 20835, page 156, dated
Was the invention built, modeled, or tested? If so, when? Yes
When was this invention built?
Was the invention made under a government contract? If so, the agency and contract number: No
Give the agency and contract number:

<b>Inventor Information</b>
Pursuant to my (our) employment agreement, I (we) submit this disclosure:

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Enter the home address of each Inventor. This information is legally required to process your Invention Disclosure.

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Type the HP Mail Stop for each Inventor.

	Mail Stop
Linda Uhlir-Tsang	1033A
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Please list the names, home addresses, telephone numbers, email addresses, and countries of citizenship of inventors who are not affiliated with HP.

### Witness Information

This invention has been explained to and understood by the following witnesses (you must name at least two witnesses).

Zia Ur Rehman  
Gary Ungefug

At what date was this invention first explained to and understood by each witness?

Zia Ur Rehman  
Gary Ungefug

Date Understood

**Attachments**

Do you have electronic document files to upload? Please convert your documents into MS Word, PowerPoint, Adobe Acrobat, or plain text format.

File

Table\_1\_for\_patent.doc

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5:59PM by Linda Uhler-Tsang

Do you have paper documents to include with your Invention Disclosure that you would like to send by FAX?

**Additional Information**

Select WKRP categories where this invention disclosure should be indexed.

Ink and Media: Ink/Vehicle

Select keywords to index this invention disclosure.

aqueous ink, bronzing, cyan ink, dye-based ink, ink, ink chemistry, ink formulation and vehicle

Was this Invention Disclosure prepared as a result of an Innovation Workshop? If you are not sure, select *No*.

No

Does this disclosure relate to a previously submitted disclosure? If so, please provide the PD number of the related disclosure and explain.

No

What is the PD Number of the disclosure this one is related to?

Explain how this disclosure is related to a previous one

**Administrative Record**

Select the name of the Patent Clerk(s) working on this Invention Disclosure:

Ann Lygas

Select the name of the Legal Admin(s) working on this Invention Disclosure:

Ann Lygas

Record the PD number assigned by Merlin and modify the date this disclosure was received, if necessary.

100202582

Enter the legal received date:

Select the name of the Patent Coordinator(s) who will work on this Invention Disclosure:

Loren E Johnson

Select the name of the Managing Attorney(s) assigned to this Invention Disclosure:

Curtis Rose

Select a Legal Entity and Site where this Invention Disclosure will be handled and reviewed:

IJS

Please select a Legal Site:

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Table 1. Relationship of Solvent pKa to Bronzing and Hue Angle Shift\*

Solvent	pKa	Bronzing?	Hue Angle
2-methyl-1,3-propanediol	>10	Yes	221.75
3-methyl-1,3,5-pentanetriol	>10	Yes	222.49
Glycerol	>10	Yes	223.24
1,2-Propanediol	>10	Yes	222.21
1,2,6-hexanetriol	>10	Yes	223.03
1,3-butylene glycol	>10	Yes	222.6
1,5-pentanediol	>10	Yes	222.67
1,2-pentanediol	>10	Yes	222.45
2-ethyl-1,3-hexanediol	>10	Yes	221.82
1,3-dimethyl-2-imidazolidinone	<0	Yes	225.26
1-(2-hydroxyethyl)-2-pyrrolidinone	>10	Yes	224.43
sulfolane	<0	Yes	223.16
2-pyrrolidinone	>10	Yes	224.53
<b>3-pyridylcarbinol</b>	<b>5 to 8</b>	<b>No</b>	227.77
1,4-butanediol	>10	Yes	223.04
1,2-hexanediol	>10	Yes	222.82
<i>diethanolamine</i>	8.88	Yes	230.49
<i>triethanolamine</i>	7.77	No	230.39
<b>N-methyldiethanolamine</b>	<b>5 to 8</b>	<b>No</b>	Not available
cyclohexanone	<0	Yes	Not available
cyclohexanol	>10	Yes	Not available
EHPD	>10	Yes	Not available
cyclopentanol	>10	Yes	Not available
cyclohexylmethanol	>10	Yes	Not available
cyclopentanone	<0	Yes	Not available
<b>N-phenyldiethanolamine</b>	<b>5 to 8</b>	<b>No</b>	Not available

\*Dye: Cyan 485/4 (pKa approx. 7.5), 10 wt% solvent, ink pH 8-8.5.

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